

CLAIMS

1. Process for treatment of excess sludges originating from at least one installation for the biological purification treatment of effluents leading to the production of excess sludges, of the type comprising  
5 at least one solubilisation step and at least one digestion step of the said sludges,  
characterised in that it comprises at least one liquid / solid separation step of the said solubilised sludges after which the liquid fraction is at least partially  
10 subjected to a digestion step before being sent to the upstream side of the said biological treatment of the said effluents, while the solid fraction of the solubilised sludges is redirected to the said solubilisation step of the said sludges.

15 2. Process according to claim 1, characterised in that it includes an intermediate complementary solubilisation step of the said solid fraction, on the upstream side of where the said sludges are sent to the said solubilisation step, using a solubilisation means  
20 different from that used in the said solubilisation step of the said sludges.

3. Process according to claim 1 or to claim 2, characterised in that it includes a thickening or dehydration step of the said sludges on the upstream side  
25 of the said solubilisation step of the said sludges.

4. Process according to claim 3, characterised in that the overflow of the said thickening step is sent to

the upstream side of the said biological treatment of the said effluents.

5        5. Process according to claim 3 or to claim 4, characterised in that the said thickening step is done with the addition of a polymer.

6. Process according to any one of claims 1 to 5, characterised in that the said solubilisation step includes at least one step in the following group:

- oxidising thermal hydrolysis;
- 10       -        non-oxidising thermal hydrolysis;
- chemical hydrolysis;
- enzymatic hydrolysis;
- biological hydrolysis;
- ultrasound treatment;
- 15       -        grinding;
- electroporation.

7. Process according to claim 6, characterised in that the said thermal hydrolysis step is carried out at a temperature of between 50°C and 180°C, and at a pressure  
20       of between 2 and 40 bars.

8. Process according to claim 7, characterised in that the said thermal hydrolysis step is carried out at a temperature of about 175°C and at a pressure of about 15 bars.

25       9. Process according to claim 7 or to claim 8, characterised in that the said thermal hydrolysis step is carried out for between 10 and 180 minutes.

10. Process according to claim 9, characterised in that the said thermal hydrolysis step is carried out for about 30 minutes.

5 11. Process according to any one of claims 6 to 10, characterised in that the said oxidising thermal hydrolysis step is done using at least one of the oxidising agents belonging to the following group:

- air;
- oxygen;
- 10 - air enriched with oxygen;
- hydrogen peroxide;
- ozone.

12. Process according to any one of claims 1 to 11, characterised in that the said digestion step is of the  
15 anaerobic type.

13. Process according to any one of claims 1 to 11, characterised in that the said digestion step is of the aerobic type.

14. Process according to claim 12 or 13,  
20 characterised in that the said digestion step is of the mesophilic type.

15. Process according to claim 12 or 13, characterised in that the said digestion step is of the thermophilic type.

25 16. Process according to any one of claims 12 to 15, characterised in that the said digestion step is advantageously performed using free and / or fixed cultures.

17. Process according to any one of claims 12 to 16, characterised in that the said digestion step is carried out for between 1 day and 20 days.

18. Process according to claim 17, characterised in that the said digestion step is carried out for between 1 day and 5 days.

19. Process according to any one of claims 1 to 18, characterised in that the said liquid / solid separation step is performed by centrifuging, filtration, dewatering, settlement.

20. Process according to any one of claims 1 to 19, characterised in that the said liquid / solid separation step is done with the addition of a flocculent.

21. Process according to any one of claims 1 to 19, characterised in that the said biological treatment uses a biological process associated with a separative membranes technique.

22. Installation for implementation of a process according to any one of claims 1 to 21, including a biological effluent (1) purification unit, characterised in that it comprises:

- at least one solubilisation unit (4) of the said sludges;

- at least one liquid / solid separation unit (6) on the downstream side of the said solubilisation unit (4);

- at least one digester (5),  
and in that it comprises:

- means of routing the liquid fraction (61) output from the said liquid / solid separation unit, to the said digester (5);

- means of routing the solid fraction (621) output from the said liquid / solid separation unit to the said solubilisation unit (4) of the said sludges;

- means of routing the said digested liquid fraction (51) to the said biological treatment unit of the said effluents.

10        23. Installation according to claim 22, characterised in that the said liquid / solid separation unit (6) comprises at least one of the following means:

- press filter,
- centrifuge;
- 15        - dewatering table or screw;
- membrane;
- settlement tank.

24. Installation according to either claim 22 or 23, characterised in that the said solubilisation unit (4) comprises at least one oxidising or non-oxidising thermal hydrolysis unit.

25. Installation according to any one of claims 22 to 24, characterised in that the said solubilisation unit (4) comprises a stirred reactor.

25        26. Installation according to any one of claims 22 to 24, characterised in that the said solubilisation unit (4) comprises an unstirred reactor.

27. Installation according to any one of claims 22 to 26, characterised in that the said digester (5) is of the fixed and / or free culture type.

28. Installation according to any one of claims 22 to 27, characterised in that the said digester (5) is of the type with an ordered lining.

29. Installation according to any one of claims 22 to 27, characterised in that the said digester (5) is of the type with a bulk lining.

30. Installation according to claim 29, characterised in that the said digester (5) is of the UASB type with pellets.

31. Installation according to any one of claims 22 to 30, characterised in that it comprises at least one thickener (7) of the said sludges on the upstream side of the said solubilisation unit.

32. Installation according to claim 31, characterised in that it includes means of routing the overflow (72) from the said thickener (7) onto the said biological purification unit (1) of the said effluents.

33. Installation according to any one of claims 22 to 32, characterised in that it comprises an intermediate unit for solubilisation of the said solid fraction on the upstream side of the said solubilisation unit of the said sludges, including a solubilisation means different from that used for solubilisation of the said sludges.

34. Installation according to any one of claims 22 to 33, characterised in that it includes separation means on membranes (2').

35. Installation according to any one of claims 22 to 34, characterised in that it includes means for ozonation of the liquid fraction re-routed to the said biological treatment unit.